

INTRODUCTION OF FORAGE PLANTS FOR
SEEDING WESTERN RANGES

by
A.C. Hull, Jr. and Howard Hyland

January 20, 1954

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A. C. Hull, Jr. and Howard Hyland 1/

1/ Respectively Forest Service and Agricultural Research
Service, U. S. Department of Agriculture

Many of the forage plants widely used for seeding western range areas have been introduced from foreign lands. Plant introduction specialists indicate that further exploration might yield new species and better strains of present species for seeding problem areas on the western range. An example of a needy problem site is the dry, saline, desert valleys with extremes of temperature and an annual rainfall of 4 to 10 inches. The spread of the poisonous annual plant, halogeton, into such sites has intensified the need for revegetating these areas. Better adapted species, especially legumes, are also needed throughout the western range area.

To help understand how forage plants are introduced and tested in the United States, this brief summary has been prepared to show the most promising areas for plant exploration, and the present methods of introduction, increase and subsequent evaluation and testing.

Promising Areas for Foreign Plant
Exploration

A study of world climates indicates that the most likely areas for collecting plant species adapted to dry western valleys and mountain regions are:

1. Northern Mongolia and Northwest China.
2. Caspian basin - several locations, especially west of the Caspian Sea.
3. Mediterranean Countries (Spain, Greece, Turkey, etc.).
4. Middle East (Afghanistan, Iran, Iraq, etc.).
5. Patagonia - rainfall is often high compared to the western United States.
6. Australia - plants are usually not winter hardy.
7. Africa - several locations, plants are usually not winter hardy.

Inasmuch as the first two areas are behind the "Iron Curtain", the best present possibility for plant exploration lies in the Mediterranean and Middle East regions. Some plants found there may have tolerances beyond where they are growing and thus prove useful in the Western United States.

How Plants are Introduced

Seed of forage plants enters the United States chiefly through:

1. Official plant explorations under direct supervision of the Division of Plant Exploration and Introduction.
2. Correspondence (Foreign experiment stations and research agencies, botanic gardens, Agricultural Attaches and U. S. technicians on foreign assignment).
3. Private plant exploration or collection.

The Division of Plant Exploration and Introduction has little control over private introductions but does encourage individuals, institutions, and agencies to introduce seed through them, in order to provide proper inspection and quarantine clearance, correct identification, and maintain permanent inventory records. Seed or plants which pass through this Division receive a PI (Plant Introduction) number for permanent reference. Special inventories have been prepared since 1947 of the most current introductions. These have been distributed to interested research agencies with certain limitations noted regarding availability of the original seed lots.

Increasing and Evaluating Foreign Plant Introductions

Prior to 1947, the Division of Plant Exploration and Introduction sent seed direct to Federal, State or, on occasion, to private research agencies. Much of this seed has been discarded or disappeared for various reasons but some is still available.

Since 1947, an attempt has been made to preserve all germ plasm in its original introduced form, even though preliminary observations may suggest immediate discarding. To facilitate this plan, four Regional Introduction Stations, each under supervision of a Regional Coordinator have been established. These stations receive introduced plant material through the discretion of the crop group specialists headquartered at the Plant Industry Station, Beltsville, Maryland. From the original data supplied with each foreign introduction, the crop specialists determine as nearly as possible which region or regions should be responsible for the subsequent increase and preliminary evaluation. Present locations of the Regional Stations are:

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1. Northeast - Geneva, New York.
2. Southern - Experiment, Georgia.
3. North Central - Ames, Iowa.
4. Western - Pullman, Washington.

Once the original seed supply is increased, lists from each of the four regional stations showing what is available for further testing are sent to all cooperating State experiment stations and other agencies. Field stations and cooperators then request those introductions of interest to their own research activities. If there are many requests, they may have to wait a year or so for sufficient seed increase. Usually the quantities available are limited to an ounce or so depending upon the species. It must be kept in mind that often just a few seeds are received originally and to increase the supply to where it can be distributed to all interested cooperators might require from 2 to 4 years. Where there is no interest in particular accessions, they may not be increased, but held for possible future reference and requests.

Seed of most forage plant introductions for the western range area is sent to the Pullman, Washington headquarters. It is then further tested and increased at interested State Experiment stations whose research programs are closely coordinated with the Division of Forage Crops and Diseases. The most active work in the Western States is presently located at Bozeman, Montana; Mandan, North Dakota, Woodward, Oklahoma; Corvallis, Oregon; Logan, Utah and Pullman, Washington.

The Soil Conservation Service has carried on plant introduction activities of their own, and has also cooperated with the State experiment stations and the Division of Plant Exploration and Introduction. Through their extensive facilities, rapid increase and effective testing of promising introductions have been possible. National headquarters for requesting and receiving foreign seeds and plants have been maintained at Beltsville, Maryland, and also a certain amount of preliminary evaluation and increase undertaken there. More active and advanced testing work is done at Regional and State levels. The most prominent locations among the Western States are the nurseries at Tucson, Arizona; Pleasanton and San Fernando, California; Aberdeen, Idaho; Waterloo, Nebraska; Albuquerque, New Mexico; Mandan, North Dakota; San Antonio, Texas; and Bellingham and Pullman, Washington.

Nurseries help determine species characteristics such as climatic adaptation, seasons and habits of growth, leafiness, seed production, and resistance to insects and disease. If the plant does well here it is then worthy of extensive field trials to determine further adaptability and how the species can best be utilized. Species showing promise are increased sufficiently so that any interested cooperating agency may obtain a supply of seed.

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Most primary and secondary evaluation stations are on relatively good sites when compared to rangelands. Because of the small amount of seed usually received, good sites are needed to assure survival and rapid seed increase. Plants growing on these good sites should be evaluated carefully for possible use on the more difficult sites. For example, it is possible that plants which make a relatively poor showing on favorable sites could be discarded before being thoroughly tested on dry western valleys or high mountain areas. To give these potential species a better trial, the experimental testing units on difficult sites should work closely with the Division of Plant Exploration and Introduction and the Soil Conservation Service. Inasmuch as forage plant introductions for the Western Region are handled through the Primary Introduction Station at Pullman, Washington, some supervision could be concentrated there. The Pullman Station should be apprised of range sites for which seed is needed. Promising material should be followed through the seed increase and preliminary evaluation phases. When seed becomes available, it may then be tested under range conditions such as dry desert, high mountains, etc., not covered at present locations.

How to Obtain Plants for Testing on Western Ranges

1. Cooperate with the Division of Plant Exploration and Introduction, Bureau of Plant Industry, Soils, and Agricultural Engineering and the Soil Conservation Service to get seed of promising species for testing under western range conditions. The Primary Station at Pullman should be kept fully informed as to the problem sites for which seed is needed.
2. Check on older introductions and plantings at field stations to see if species showing promise for seeding dry sites on western ranges have been overlooked.
3. If specific plants are desired, advise the Division of Plant Exploration and Introduction headquarters. They will check past introductions and if the plant is not already in the United States they will make contact with foreign countries where the plant is known to occur. Plants cannot be obtained from Iron Curtain countries at the present time.
4. If plants are wanted for a particular site, send a complete site description to the Division of Plant Exploration and Introduction. They will (a) determine whether plants of possible adaptation are already in the United States; (b) write to foreign countries for such plants; and (c) consider these requests during future foreign plant exploration.

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5. Make contacts with agencies or individuals in foreign countries to obtain promising range plants. Where such contacts result in seed being made available, final instructions should be given to address the seed shipments as follows:

U.S.D.A. Inspection House
224 -12th- Street, S. W.
Washington 12, D. C.

At this location proper inspection and quarantine facilities are provided. Data pertaining to actual origin of each seed lot, date of collection, collector's name and pertinent growth habits should be included inside the package with the seed samples. Upon completion of the Inspection House routines, the seed is then sent to the receiving agencies.

Sending Seed to Foreign Countries

The Division of Plant Exploration and Introduction has a responsibility for filling requests for seed or plants received from foreign research agencies. These may be under governmental or private supervision. Many such requests come to the field, either through reference from agencies or direct. The desired seed may be returned to the requesting agency who will in turn arrange for inspection and shipment. If the request comes direct from a foreign country, the plant material and complete shipping instructions should be sent to the USDA Inspection House, 224 -12th- Street, S. W., Washington 12, D. C. Most countries require Federal inspection certificates from the United States, and these are provided at the Inspection House headquarters.

In filling such requests the amount of seed is usually limited to "experimental quantities". The definition of this amount naturally depends upon size of seed, availability, intended purpose, transportation and other factors. Usually, requests for a pound of seed are considered beyond "experimental" size and can best be filled by commercial seed houses. Addresses of such sources are supplied to foreign agencies upon request.

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